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Docket 86533PCW
Customer No. 01333

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of

David N. Nichols, et al

IMAGE SENSOR WITH
TRANSPARENT TRANSISTOR
GATES

Serial No. 10/629,885

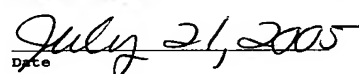
Filed July 29, 2003

Group Art Unit: 2811

Examiner: Gebremariam, Samuel A.

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Lois A. Massar


Date July 21, 2005

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Commissioner for Patents

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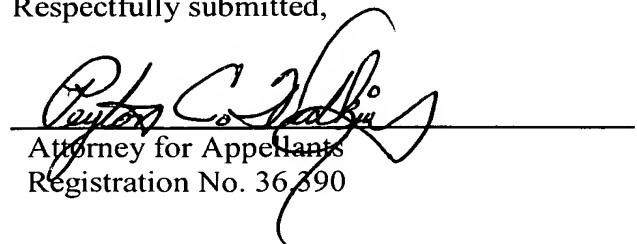
Sir:

APPEAL BRIEF TRANSMITTAL

Enclosed herewith is Appellants' Appeal Brief for the above-identified application.

The Commissioner is hereby authorized to charge the Appeal Brief filing fee to Eastman Kodak Company Deposit Account 05-0225. *A duplicate copy of this letter is enclosed.*

Respectfully submitted,


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Enclosures

If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.



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APPEAL BRIEF PURSUANT TO 37 C.F.R. 41.37 and 35 U.S.C. 134

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APPELLANT'S BRIEF ON APPEAL

Appellants hereby appeal to the Board of Patent Appeals and Interferences from the Examiner's Final Rejection of claims which was contained in the Office Action mailed March 1, 2005.

A timely Notice of Appeal was filed May 26, 2005.

Real Party In Interest

As indicated above in the caption of the Brief, the Eastman Kodak Company is the real party in interest.

Related Appeals And Interferences

No appeals or interferences are known which will directly affect or be directly affected by or have bearing on the Board's decision in the pending appeal.

Status Of The Claims

In the application, claims 1-3 remain pending and are the subject of this appeal.

Appendix I provides a clean, double-spaced copy of the claims on appeal.

Status Of Amendments

The last amendment filed prior to this appeal, mailed April 7, 2005, has been entered into the record of the subject patent application.

Summary of Claimed Subject Matter

Charge-coupled device image sensors include an array (either 1 or 2 dimensional array) of pixels each of which captures incident light that is converted into charge packets (representative of the captured scene). The pixels also contain charge-coupled devices that transfer their respective charge packets line-by-line down the array into a horizontal shift register. For example, the lower most line enters the horizontal shift register first and then is shifted out of the horizontal shift register for processing and this is repeated until the entire array is read out. An output circuit receives the charge packets from the horizontal shift register for the above-mentioned processing, primarily the conversion of the amount of charge to a voltage.

The present invention uses a transparent conductor for a gate electrode in the output circuit; more specifically the output circuit uses indium tin oxide as the transparent conductor.

Grounds of Rejection to be Reviewed on Appeal

The following issues are presented for review by the Board of Patent Appeals and Interferences:

1. Whether the use of a transparent conductor, such as indium tin oxide, for a gate electrode in the output circuit of a charge-coupled device image sensor is obvious in light of prior art of record which teaches the use of a transparent conductor *only* in the photosensitive region.

Arguments

Obvious-To-Try

The final rejection states that Stevens teaches each element of claim 1 except that Stevens does not teach the use of a transparent conductor for a gate electrode in the output structure. The final rejection then states that “the use of transparent conductor as a gate electrode is conventional and also taught by Matsumoto in the structure [of] an image sensor.” The applicants then clarified the technical misunderstanding of the teachings of Matsumoto as summarized in the rejection. More specifically, the applicant clarified that Matsumoto teaches the use of ITO *only* in the photo-response region (image capture region within the pixels) since its use is desirable in this region. An affidavit was provided which substantiated the technical teachings of Matsumoto.

The advisory action then states:

applicant does not provide any evidence as to why it is not obvious to use ITO as an output gate electrode. Furthermore, applicant's statement that regions outside the image-capturing regions are often shielded, so that any stray light does not degrade the sensor performance, does not mean these regions must be shielded. Applicant's device, as well as the structure of Stevens does not provide any shielded regions outside the image capturing area.

The above quoted language from the advisory action highly suggests that the standard used in the rejection is an obvious-to-try standard. Precedent clearly states that a prima facie case of obviousness is not established when “the prior art did not suggest the combination or convey to those of ordinary skill in the art a **reasonable expectation** of success of making it.” (Emphasis added) *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) The affidavit clearly illustrates that there was not a reasonable expectation of success by those skilled in that art; however, the rejection articulates that applicants must prove with “absolute certainty” that there will be no success, which is not the standard for obviousness. It is respectfully submitted that a “reasonable expectation” of no success has been proved by Applicants and that the rejection is therefore not appropriate.

An obvious-to-try situation exists when a general disclosure may pique the scientist's curiosity, such that further investigation might be done as a result of the disclosure, but the disclosure in itself does not contain a sufficient teaching of how to obtain the desired result, or that the claimed result would be obtained if certain directions were pursued. In re Eli Lilly & Co., 902 F.2d. 943, 14 USPQ2d 1741 (Fed. Cir. 1990)

The simple teaching of ITO in the image capture portion of the sensor is merely a general disclosure, but it does not disclose that the claimed results would be obtained (with certain directions for the claimed result).

Teaching Away

In addition, “a reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the paths set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.” *In re Gurley*, 27 F.3d 551, 31 USPQ2d 1130 (Fed. Cir. 1994) Again, Applicants have repeatedly stated that the reference teaches the use of a transparent material, or ITO, **only** in the image capture portion since this creates desirable absorption of the light, and in output circuit, the use of this material is anticipated to be undesirable because it is anticipated to create “noise” in the output circuitry. It is respectfully submitted that this is clear teaching away from the claimed invention.

General

The advisory action stated that Applicant's device, as well as the structure of Stevens does not provide any shielded regions outside the image capturing area. This statement is true. Stevens uses a "polysilicon" gate electrode for the output amplifier, and polysilicon is less transmissive to light than ITO or similar transparent conductor. As stated earlier, allowing more light into the output amplifier was expected to create noise in the output circuitry; therefore, the claimed result was not anticipated or obvious in light of the prior art.

As for the claimed invention, it is true that there is not a light shield, but the anticipated results of a degraded image as a result of using ITO was actually not discovered during testing of the claimed invention. "Rebuttal [of a prima facie case of obviousness based on structural similarity] can consist of a comparison of test data showing: (a) that the claimed compositions possess unexpected improved properties or properties that the prior art does not have." *In re Dillon*, 919 F.2d 688, 16 USPQ2d 1897 (Fed. Cir. 1990) (in banc)

As for Asada et al, which is discussed in the advisory action, Asada teaches the use of ITO as an input or an output electrode to an IC driver circuit in a liquid crystal display unit. Unlike this invention, the input and output electrodes taught by Asada are not used as a gate electrode of a transistor, nor are they used within an integrated circuit, but are simply electrical interconnects between the display electrodes and the integrated circuit driver. It is noted that transistors are used within the integrated circuit driver, but Asada is silent about construction of the integrated circuit drivers and materials of their gate electrodes. Therefore, Asada does not teach the use of ITO as a gate electrode of a semiconductor transistor, but simply as an electrical interconnect. ITO as a simple interconnect is unaffected by light, and no degradation is expected in this display application.

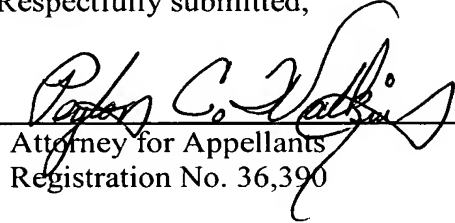
Summary

It is respectfully submitted that the Office Action has presented an obviousness rejection that relies upon inappropriate principles for obviousness. More specifically, the prior art of record "teaches away" from the claimed invention and is based upon, in Applicant's respectfully submitted position, an obvious-to-try standard for obviousness. Since this is contrary to the requirements for maintaining a prima facie case of obviousness, the rejection of the claims set forth in the Office Action must be withdrawn.

Conclusion

For the above reasons, Appellants respectfully request that the Board of Patent Appeals and Interferences reverse the rejection by the Examiner and mandate the allowance of Claims .

Respectfully submitted,



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Appendix I - Claims on Appeal

1. An image sensor comprising:
 - (a) an image sensing portion for receiving incident light that is converted to a plurality of charge packets;
 - (b) a transfer mechanism for transferring the charge packets from the image sensing portion; and
 - (c) an output structure that receives the charge packets from the transfer mechanism for transporting output signals from the image sensor, wherein the output structure comprises a transparent conductor for a gate electrode.
2. The image sensor as in claim 1, wherein the transparent conductor is indium tin oxide (ITO).
3. The image sensor as in claim 1, wherein the output structure is a source follower and the transparent conductor is indium tin oxide (ITO).